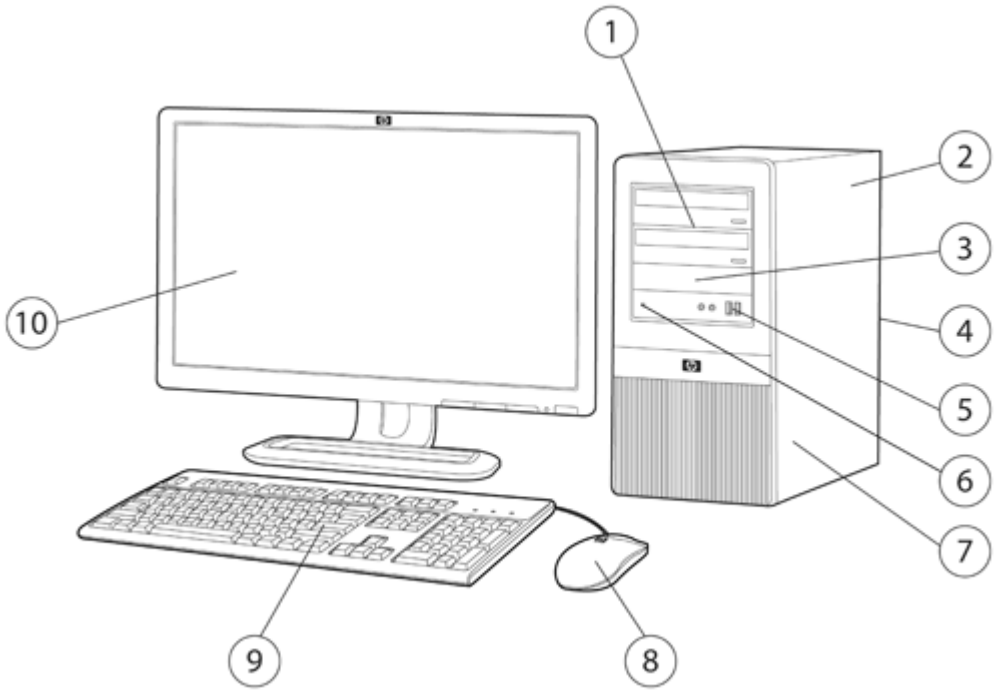
Overview

HP recommends
Windows Vista® Business

Microtower*

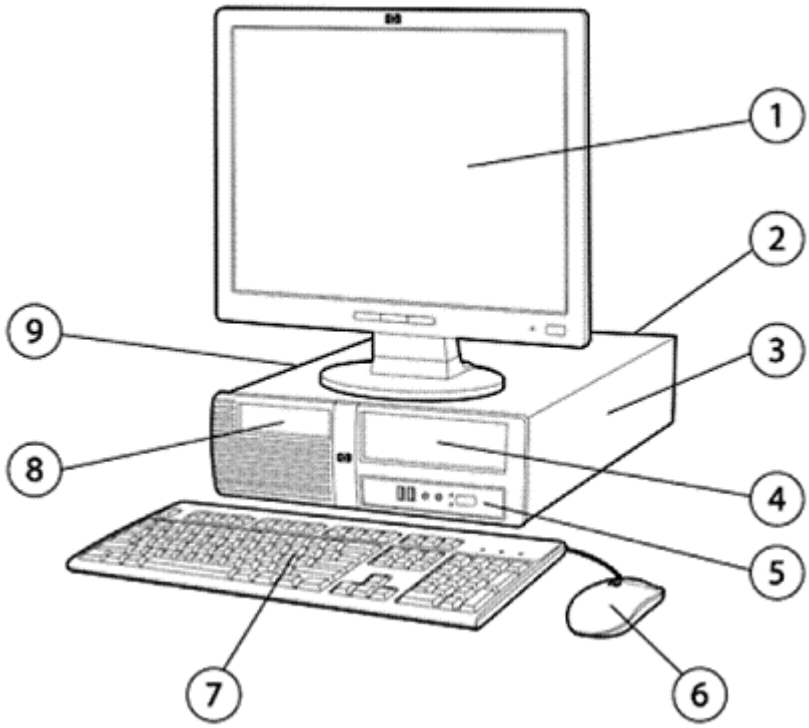


1. (2) external 5.25” drive bays for optional optical drives; (2) internal 3.5” hard drive drive bays
2. 250W PFC power supply as default; 300W PFC or 300W 85% Efficiency*** power supply as option
3. (1) external 3.5” drive bay for optional media reader or diskette drive
4. Rear IO: (6) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) VGA, (1) Parallel, (1) COM, (1) audio in – (1) audio out – (1) MIC
5. Front I/O: (2) USB 2.0 ports, (1) MIC – (1) audio out (Headphone)
6. Recovery/reset button**
7. (2) full-height PCI 2.3 slot, (1) PCIe x1 slots, (1) PCIe x16 slot
8. PS/2 Scroll Mouse
9. HP Standard Keyboard
10. Monitor (sold separately)

* Model dx2818 (available only in China) differentiate from dx2810 on the front bezel: there is Chinese characters on the top-right of center band
**Reset function will be set for China/Hong Kong/Korea; Recovery function will be set for the rest of APJ
*** 85% Efficiency power supply is used on dx2810 special edition PC only

Overview

Small Form Factor



1. Monitor (sold separately)
2. Rear IO: (6) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) VGA, (1) Parallel, (1) COM, (1) audio in – (1) audio out – (1) MIC
3. 250 watt PFC power supply
4. (1) external 5.25" drive bay for optional optical drives; (1) internal 3.5" drive bay
5. Front I/O: (2) USB 2.0 ports, (1) MIC - (1) audio out (Headphone)
6. PS/2 Scroll Mouse
7. HP Standard Keyboard
8. (1) external 3.5" drive bay for optional media reader or diskette drive
9. (2) Low-profile PCI 2.3 slot, (1) PCIe x1 slots, (1) PCIe x16 slot

Overview

At A Glance

- Support for Intel® Core™ 2 Duo and Core™ 2 Quad processors, Intel Pentium® dual-core processors, Intel Celeron® processors
- Choice of operating systems:
  - Genuine Windows Vista Business 32
  - Genuine Windows Vista Business 64
  - Genuine Windows Vista Home Basic
  - Genuine Windows Vista Business with downgrade to Windows XP Professional custom installed
  - Genuine Windows XP Home Basic (China only)
  - Novell Sled
  - Red Flag (China only)
  - FreeDOS
- Intel G45 Express Chipset
- Legacy parallel and serial port support
- Intel I/O Controller Hub 10 (ICH10R)
- Intel Graphics Media Accelerator X4500HD with DX10 support
- PCI Express I/O bus
- Serial ATA controller
- Realtek 8111C-VB-GR Gigabit Ethernet Controller
- Choice of hard drives and optical drives
- DDR2 SDRAM system memory
- 250W PFC HV immunity power as Standard configuration (300W PFC HV immunity power supply or 300W 85% Efficiency power supply can be selected as option on Microtower)
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions and exclusions apply.

Standard Features and Configurable Components

Processor and Speed One of the following	**Intel Celeron Processors** Intel Celeron 430 Processor (1.80 GHz, 512 KB L2 cache, 800 MHz FSB) Intel Celeron 440 Processor (2.00 GHz, 512 KB L2 cache, 800 MHz FSB) Intel Celeron 450 Processor (2.2-GHz, 512-KB L2 cache, 800-MHz FSB) **Intel Celeron Dual-Core Processors** Intel Celeron Dual Core E1200 Processor (1.60 GHz, 512 KB L2 cache, 800 MHz FSB) Intel Celeron E1400 Processor (2.0-GHz, 512K L2 cache, 800-MHz FSB) Intel Celeron E1500 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB) Intel Celeron E3200 Processor (2.4-GHz, 1-MB L2 cache, 800-MHz FSB) Intel Celeron E3300 Processor (2.5-GHz, 1-MB L2 cache, 800-MHz FSB) **Intel Pentium Dual-Core Processors** Intel Pentium E2200 Processor (2.2-GHz, 1-MB L2 cache, 800-MHz FSB) Intel Pentium E2220 Processor (2.4-GHz, 1-MB L2 cache, 800-MHz FSB) Intel Pentium E5200 Processor (2.5-GHz, 2-MB L2 cache, 800-MHz FSB) Intel Pentium E5300 Processor (2.6-GHz, 2-MB L2 cache, 800-MHz FSB) Intel Pentium E5400 Processor (2.7-GHz, 2-MB L2 cache, 800-MHz FSB) Intel Pentium E6300 Processor (2.8-GHz, 2-MB L2 cache, 1066-MHz FSB) Intel Pentium E6500 Processor (2.93-GHz, 2-MB L2 cache, 1066-MHz FSB) **Intel Core 2 Duo Processors** Intel Core 2 Duo E7300 Processor (2.66-GHz, 3 MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo E7400 Processor (2.8-GHz, 3 MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo E7500 Processor (2.93-GHz, 3 MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo E7600 Processor (3.06-GHz, 3 MB L2 cache, 1066-MHz FSB) Intel Core 2 Duo E8400 Processor (3.0-GHz, 6 MB L2 cache, 1333-MHz FSB) Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333-MHz FSB) Intel Core 2 Duo E8600 Processor (3.33-GHz, 6 MB L2 cache, 1333-MHz FSB) **Intel Core 2 Quad Processors** Intel Core 2 Quad Q6600 Processor (2.4-GHz, 8 MB L2 cache, 1066-MHz FSB) Intel Core 2 Quad Q8200 Processor (2.33-GHz, 4 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q8300 Processor (2.5-GHz, 4 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q8400 Processor (2.66-GHz, 4 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q9400 Processor (2.66-GHz, 6 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q9550 Processor (2.83-GHz, 12 MB L2 cache, 1333-MHz FSB) Intel Core 2 Quad Q9650 Processor (3.0-GHz, 12 MB L2 cache, 1333-MHz FSB) **NOTE:** Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

Standard Features and Configurable Components

Operating Systems and Application Software (availability varies by region)

Genuine Windows Vista Business 32*
Genuine Windows Vista Business 64*
Genuine Windows Vista Home Basic*
Genuine Windows Vista Business downgrade to Windows XP Professional custom installed*†
Genuine Windows XP Home Basic**(China only)
Novell Sled**
Red Flag (China only)
Free DOS

* Certain Windows Vista product features require advanced or additional hardware. See: http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor.
† Windows Vista Business disk may be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order annually at least 25 customer systems with the same custom image.
** Launch in February 2009

Microsoft Office 2007 Basic
Microsoft Office 2007 Small Business
Microsoft Office 2007 Professional
HP Backup and Recovery Manager

Mozilla Firefox for HP Virtual Solutions
Hard Disk Partitioning
Roxio Easy Media Creator 10**
Intervideo WinDVD 8**
McAfee Total Protection Anti-Virus***
PDF Complete
2008 Intel Matrix Storage Manager
HP Power Manager v2.0 (Edison)
Credential Manager 2.5 for dx Series
HP Total Care Advisor
Sun Java Runtime Environment
Welcome Center SMB Offers

** Supporting software available with certain optical drive configurations
*** 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

Internal Storage

80-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
160-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
250-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
320-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)
500-GB Serial ATA 3.0 Gb/s Hard Driver (7200 rpm)
64-GB SATA Solid State Drive

Standard Features and Configurable Components

System Memory	512 MB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (1 x 512 MB) 1 GB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (2 x 512 MB) 1 GB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (1 x 1 GB) 2 GB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (2 x 1 GB) 3 GB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (3 x 1 GB) 4 GB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (4 x 1 GB) 4 GB DDR2 Synch DRAM PC2-6400 (800 MHz) Non-ECC (2 x 2 GB) 8-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 2GB) (for MT only) 16-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 4GB) (for MT only) **NOTE:** For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.
Storage – One or more of the following (see Storage section below)	**Diskette Drive** 1.44 MB Diskette Drive **Media Reader** HP 22-in-1 Media Reader with 1394 HP 22-in-1 Media Reader **Optical Drives (Serial ATA)** SATA DVD-ROM Drive SATA SuperMulti LightScribe DVD Writer Drive HP SATA Blu-ray Writer
Input Devices	**Keyboard – One of the following** HP PS/2 Standard Keyboard HP USB Standard Keyboard **Mouse – One of the following** PS/2 2-Button Optical Scroll Mouse USB 2-Button Optical Scroll Mouse USB 2-Button Laser Mouse
Audio	Realtek ALC662 High Definition audio codec 3D audio compliant with AC'97 Rev. 2.3 and HD Audio compatible Internal PC speaker MT Internal PC speaker SFF HP USB Powered Flat Speakers

Standard Features and Configurable Components

Communication	Realtek 8111C-VB-GR GbE Ethernet Controller Intel Gigabit CT Desktop NIC LSI PCIe x1 56K International SoftModem HP Wireless 802.11 b/g/n PCIe x1 Card
Graphics	Intel Graphics Media Accelerator X4500HD ATI Radeon HD 2400XT 256MB Dual Head graphics adapter (PCIe x16) ATI Radeon HD 3450 256MB Single Head PCIe x16 Card ATI Radeon HD 3470 256MB Single Head graphics adapter (PCIe x16) ATI Radeon HD 4350 (512MB) FH PCIe x16 Card (for MT only) ATI Radeon HD 4350 (512MB) LP PCIe x16 Card (for SFF only) ATI Radeon HD 4550 Dual Head PCIe x16 Graphics Card (FH for MT only) NVIDIA GeForce 205 512MB ATX PCIe x16 (for MT only) NVIDIA GeForce 315 1GB ATX PCIex16 (for MT only) HP ADD2 SDVO PCIe DVI-D Adapter HP DisplayPort To DVI-D Adapter (for HD3470 and HD3650) HP DisplayPort To VGA Adapter (for HD3470 and HD3650)
Miscellaneous	Hood Sensor MT Hood Sensor SFF Rear I/O Port Cover (MT only) 2nd serial port Belkin 3-port 1394, FH for MT Belkin 3-port 1394, LP for SFF

System Details

Base Unit

- MT: Micro ATX Microtower chassis, including power supply and front bezel; five (5) drive bays and four expansion slots (full height)
- SFF: Micro ATX Small Form Factor chassis, including power supply and front bezel; three (3) drive bays and four expansion slots (low profile)
- Active type heatsink
- 92 x 92 x 25 mm chassis fan for Microtower chassis
- No chassis fan for Small Form Factor chassis
- System board with Intel G45 Express chipset, Intel I/O Controller Hub 10R (ICH10R), Realtek RTL8111C Ethernet controller, Intel GMA X4500HD graphics, and Realtek audio, (1) PCI Express x1 slots, (1) PCI Express x16 slot, (2) PCI, (4) DDR2 DIMM memory slots, (4) Serial ATA data connectors, (8) USB Ports (see USB support below), (1) Parallel and (1) serial port in the rear IO
- Power cord

Slots

	MT	SFF
PCI	One (1) full-height PCI Express x1 slots on PCA One (1) full-height PCI Express x16 slot on PCA (for graphic cards) Two (2) full-height PCI slots on PCA	One (1) low-profile PCI Express x1 slots on PCA One (1) low-profile PCI Express x16 slot on PCA (for graphic cards) Two (2) low-profile PCI slots on PCA
Memory Expansion	Four (4) DDR2 SDRAM DIMM slots (16 GB maximum memory support)	Four (4) DDR2 SDRAM DIMM slots (4 GB maximum memory support)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Bays

Internal	MT: Two (2) 3.5-inch SFF: One (1) 3.5-inch
External	MT: Two (2) 5.25-inch; One (1) 3.5-inch SFF: One (1) 5.25-inch; One (1) 3.5-inch

USB Support

EHCI high-speed USB 2.0 controller

Two (2) front ports; Six (6) rear ports

Six (6) internal ports on system board:

- 2 for front ports
- 2 for media card reader
- 2 reserved for future upgrade

System Details

Interfaces (Legacy)	One (1) PS/2 keyboard port One (1) PS/2 mouse port One (1) analog VGA video port One (1) Parallel port One (1) serial port One (1) line in; one (1) line out; one (1) mic in One (1) RJ45 network port

Weight & Dimensions (MT)	**Chassis Dimensions** (H x W x D)	15.14 x 7.27 x 16.36 in 385 x 185 x 416 mm
	Packaged Dimensions (D x L x W)	19.63 x 24.13 x 10.56 in 498.6 x 613 x 268.2 mm
	System Weight	18.4 lb (8.34 kg)
	Shipping Weight	26.7 lb (12.1 kg)

Weight & Dimensions (SFF)	**Chassis Dimensions** (H x W x D)	3.98 x 13.35 x 15.24 in 101 x 339 x 387 mm
	Packaged Dimensions (L x W x H)	23.38 x 19.68 x 9.0 in 593.8 x 500.0 x 228.6 mm
	System Weight	14.96 lb (6.79 kg)
	Shipping Weight	23.00 lb (10.43 kg)

Technology and Features	**Memory Type**	PC2-6400 DDR2 SDRAM (800MHz) non-ECC Up to 16 GB system memory standard
	NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.	
	Hard Drive Interfaces Supported	Serial ATA, RAID and NCQ support

System Details

Chassis	**Front Panel**	Power button Power On LED HDD Activity LED Reset/recovery button (MT only) *
	Cooling Solutions Supported	Power Supply Fan (variable speed) Active heatsink (variable speed) Chassis fan (variable speed) (MT only)
	Slots Supported	Four (4) full-height expansion slots
	Front I/O	MT: Two (2) USB 2.0 ports, Headphone, Mic SFF: Two (2) USB 2.0 ports, Headphone, Mic
	Rear I/O	Standard Micro ATX I/O connectors, including six (6) USB 2.0 ports, serial and parallel ports
	Drive Bays (MT)	Two (2) 5.25-inch (13.335 cm) half height external One (1) 3.5-inch (8.89 cm) half height external Two (2) 3.5-inch (8.89 cm) half height internal
	Drive Bays (SFF)	One (1) 5.25-inch (13.335 cm) half height external One (1) 3.5-inch (8.89 cm) half height external One (1) 3.5-inch (8.89 cm) half height internal
	Internal Speaker	Optional
	Security	Padlock loop Kensington Lock Support Noble Universal Clamp Lock Cable Kit
	Power Supply	MT: both 250W and 300-watt ATX Power Supply – PFC HV immunity (410V/s) with a 115v/230v line switch (varies by country/region), 300W 85% Efficiency power supply as option** SFF: 250-watt Power Supply – PFC PFC HV immunity (410V/s) with a 115/230v line switch.

*Reset function will be set for China/Hong Kong/Korea; Recovery function will be set for the rest of APJ
**85% Efficiency power supply is used on dx2810 special edition PC only

Unit Environment and Operating Conditions

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 4 in (10.2 cm) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range (MT)	**Operating**	41° to 95° F (5° to 35° C)
	Non-operating	-22° to 149° F (-30° to 65° C)
Relative Humidity (MT)	**Operating**	10% to 90% (non-condensing at ambient)
	Non-operating	5% to 95% (non-condensing at ambient)

System Details

Maximum Altitude (MT) (unpressurized)	**Operating**	10,000 ft (3048 m)
	Non-operating	30,000 ft (9144 m)
Temperature Range (SFF)	**Operating**	50° to 95° F (10° to 35° C)
	Non-operating	-22° to 140° F (-30° to 60° C)
Relative Humidity (SFF)	**Operating**	10% to 90% (non-condensing at ambient)
	Non-operating	10% to 95% (non-condensing at ambient)
Maximum Altitude (SFF) (unpressurized)	**Operating**	10,000 ft (3048 m)
	Non-operating	30,000 ft (9144 m)

NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 7500 ft (2286 m) for MT and 10000 ft (3000m) for SFF above sea level, no direct sustained sunlight. Maximum rate of change is 7.5 deg C/Hr for MT and 10 deg C/Hr for SFF. The upper limit may be limited by the type and number of options installed.

System Board	**Processor**	Socket T; LGA775 industry standard Micro ATX form factor Support single Intel Core 2 Duo and Core 2 Quad, Pentium dual-core, or Celeron processors
	PWM	ON – NCP5392 – 4 phase
	Chipset	Intel G45S Express Intel I/O Controller Hub 10 (ICH10R)
	Super I/O	Fintek F71862
	Front Side Bus Frequency	800/1066/1333 MHz
	Memory	DDR2 SDRAM 4 x DIMM slots
	Clock Generator	IDTCV193BPAG
	Integrated Graphics	Intel Graphics Media Accelerator (GMA) X4500HD
	Audio	Realtek ALC662 HD Audio compatible codec with two channel audio 3D audio compliant with AC'97 rev. 2.3
	LOM	Realtek RTL8111C
	Storage	Four Serial ATA interfaces
	Expansion Slots	1 x PCI Express x1 slots 1 x PCI Express x16 slot 2 X PCI
	BIOS	SPI FLASH ROM
	Industrial Standard	PCIe compliant USB 2.0
	Rear Side I/O Ports	1 x PS/2 keyboard port 1 x PS/2 mouse port 6 x USB 2.0 ports 1 x RJ-45 10/100/1000 port 1 x serial port 1 x parallel port 1 x DB 15-pin analog VGA port 3 x audio ports

System Details

On Board I/O Interfaces	1 x ATX power connector 1 x +12V power connector 1 x Floppy connector 1 x LPC connector 1 x header (1 – 1x2) to support hood sensor 1x COM2 header 1 x Front panel connector, Switch, LED (ON/Flash/OFF) 2 x Fan headers for CPU, chassis, with voltage/fan speed control 1 x header (1 – 2x5,) to support 2 USB 2.0 ports at front side 1 x header (1 – 2x5) to support USB Card Media Reader 1 x header (1 – 2x5) to support additional USB devices, such as tax controoler 1 x header (1 -–1x2) to support one touch reset 1 x header (1 – 1x2) to support one touch recovery 1 x header to support 2 front (Headphone/Mic) audio ports
Board Size	Micro-ATX, PCB Size: 9.6 x 9.6 in (24.38 x 24.38 cm) 4-layer PCB with green color
Additional Features	Bootable without keyboard, mouse or monitor Keyboard/mouse/USB wake up Support S3, S4 and S5 ACPI status Hardware monitor capability CPU fan speed control One button reset/recovery*

*Reset function will be set for China/Hong Kong/Korea; Recovery function will be set for the rest of APJ

Network Interface	Realtek 8111C-VB-GR GbE Ethernet Controller Intel Gigabit CT Desktop NIC
Wireless	MT: Wireless 802.11b/g/n PCIe Card (full height bracket) SFF: Wireless 802.11b/g/n PCIe Card (low profile bracket)

System Details

Power supply			
	Microtower		Small Form Factor
Model	250W/300W PFC+HV	300W 85% Eff	250W PFC+HV
Standard Efficiency	N/A	300W standard efficiency active PFC	N/A
Energy Efficient	N/A	300W 85% efficient active PFC	N/A
Operating Voltage Range	90 to 132 VAC, or 180 to 264 VAC	90 to 264 VAC	90 to 132 VAC, or 180 to 264 VAC
Rated Voltage Range	100 to 127 VAC, or 200 to 240 VAC	100 to 240 VAC	100 to 127 VAC, or 200 to 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Rated Input Current	8A/4A	8A/4A	7A/3.5A
115V/230V Line switch	Yes	N/A	Yes
Rated Input Current with Energy Efficient* Power Supply	N/A	8A/4A	N/A
Current Leakage (NFPA 99)	<3.5mA	<275 µA	<3.5mA
System Heat Dissipation	250W: 48.5 W or 165.482 BTU/hr.(For 115V/60Hz) 48.2 W or 164.4584 BTU/hr. (For 30V/50Hz) 300W: 50.4W or 171.9648 BTU/hr. (For115V/60Hz) 50.3W or 171.6236 BTU/hr.(For 230V/50Hz)	43.1W or 147.0572BTU/hr. (For 115V/60Hz) 43.2W or 147.3984 BTU/hr. (For 230V/50Hz)	51.9W or 177.0828 BTU/hr. (For 115V/60Hz) 51.4W or 175.3768 BTU/hr. (For 230V/50Hz)
System Heat Dissipation with Energy Efficient* Power Supply	N/A	43.1W or 147.0572BTU/hr. (For 115V/60Hz) 43.2W or 147.3984 BTU/hr. (For 230V/50Hz)	N/A
Power Supply Fan	80mm variable speed	80mm variable speed	80mm variable speed
FEMP Standby Power Compliant (<2W in S5 – Power Off)*	250W: 0.45W (For 115V/60Hz) 0.53W (For 230V/50Hz) 300W: 0.65W (For 115V/60Hz) 0.71W (For 230V/50Hz)	0.17W (For 115V/60Hz) 0.37W (For 230V/50Hz)	0.26W (For 115V/60Hz) 0.30W (For 230V/50Hz)
Power Consumption in ES Mode – Suspend to RAM (S3) (Instantly Available PC)	<3W	<2.7W	<1W
High voltage immunity	up to 410V/s	N/A	up to 410V/s
China Telecom YD/T 993-2006 spec	Yes	N/A	Yes

System Environmental Specs

- Values are subject to change without notification and are for reference only.
- Performance of system, options, and ancillary equipment will vary depending on the system

configuration.

- Levels presented do not account for non-HP/Compaq installed hardware.

Ambient Air Temperature	**Operating**	MT: Operating 41° to 95°F (5 to 35°C) (Test 0 to 104°F (40°C)); SFF: 50° to 95°F (10° to 35°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 10000 ft (3048 m), no direct sustained sunlight. Maximum rate of change is 50°F/Hr (10°C/Hr). The upper limit may be limited by the type and number of options installed.
	Storage	MT: Storage: 90% RH @ 60°C for 12 hours (Non-condensing) SFF: –22° to 140°F (–30° to 60°C).
Humidity	**Operating**	MT: 10% to 90% relative humidity (Rh), 35°C non-condensing SFF: 10% to 90% relative humidity (Rh), 35°C maximum wet bulb temperature, non-condensing
	Storage	MT: 90% relative humidity (Rh), 60°C for 12 hours, non-condensing SFF: 90% relative humidity (Rh), 60°C for 12 hours, non-condensing
Altitude	**Operating**	MT: 0 to 10,000 feet (0 to 3048 meters) – This value may be limited by the type and number of options installed. SFF: 0 to 10,000 feet (0 to 3048 meters) – This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1,000 ft/min (304.8 m/min).
	Non-Operating	MT: 0 to 30,000 feet (0 to 9,144 meters) SFF: 0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).
Shock	Listed are the levels of shock the product can withstand with No damage being incurred. The values represent peak input acceleration during an 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	Non-Operating	MT: 35G's (Half-sine Shock) 30G's (Trapezoidal Shock) SFF: 35G's (Half-sine Shock) 45G's (Trapezoidal Shock)
Vibration	Listed are the levels of vibration the product can withstand with No damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range.	
	Operating	MT: Random vibration at 5Hz@0.00025G^2/Hz, 10Hz@0.01G^2/Hz, 100Hz@0.01G2/Hz, 300Hz@0.00001G^2/Hz 5Hz to 300Hz, (0.25G's nominal).

System Details

		SFF: Random vibration at 5Hz@0.00025G²/Hz, 10Hz@0.01G²/Hz, 100Hz@0.01G²/Hz, 300Hz@0.00001G²/Hz 5Hz to 300Hz, (0.25G's nominal).
	Non-Operating	MT: ~2.09Grms (5-500Hz), Non-Operational SFF: Random vibration at 0.008G²/Hz, 10Hz to 500Hz, (2 Grms nominal).

Acoustic Noise

Listed are the declared A-WEIGHTED SOUND POWER LEVELS (LWAd) and declared average desktop seated operator position A-WEIGHTED SOUND PRESSURE LEVELS (LpAm) when the product is operating in a 73.4°F (23°C) ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

MT: IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA
SFF: IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA
MT: FIXED DISK (Random write)	LWAd = 4.4 Bels, Desktop Average LpAm = 33 dBA
SFF: FIXED DISK (Random write)	LWAd = 4.4 Bels, Desktop Average LpAm = 33dBA
MT: DVD-ROM (Sequential Reads)	LWAd = 5.5 Bels, Deskside Average LpAm = 44 dBA
SFF: DVD-ROM (Sequential Reads)	LWAd = 5.2 Bels, Deskside Average LpAm = 42dBA

Service and Support

On-site Warranty[1]: 1-1-1, 3-1-1, 3-3-3, 4-4-4, 5-5-5, 3-3-3 limited or 90-0-0 limited warranty delivers on-site, next business-day[2] service for parts and labor and includes free telephone support[3] 24 x 7. Global coverage[2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. One-year onsite and labor are not available in all countries.

[1] Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

[2] On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

[3] Technical telephone support applies only to HP-configured Compaq and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

After-Market Options

Communications	**NICs**	
	Intel Gigabit CT Desktop NIC	FH969AA
	Wireless LAN	
	HP Wireless 802.11/b/g/n PCIe x1	FH971AA
	Modems	
	LSI PCIe x1 56K International SoftModem	FH970AA
Hard Disk Drives	HP 500 GB SATA 3.0-Gb/s Hard Drive	PV943A
	HP 320-GB SATA 3.0-Gb/s Hard Drive	FH963AA
	HP 250 GB SATA 3.0-Gb/s Hard Drive	PY278AA
	HP 160 GB SATA 3.0-Gb/s Hard Drive	PY277AA
	HP 80 GB SATA 3.0-Gb/s Hard Drive	PY276AA
	HP 64 GB SATA Solid State Drive	VG679AA
Removable Storage Devices	**Diskette Drive**	
	HP 1.44 MB USB Diskette Drive – External	DC141B
	22-in-1 Media Reader	FX273AA
	HP 22-in-1 Media Card Reader-BLK	AR941AA
Input Devices	**Keyboards**	
	HP PS/2 Standard Keyboard	DT527A
	HP USB Standard Keyboard	DT528A
	HP USB PS2 Washable Keyboard	VF097AA
	HP 2.4 GHz Wireless Keyboard & Mouse	NB896AA#B13
	HP USB Smartcard Keyboard (Carbonite/Silver)	ED707AA#xxx
	Mice	
	HP USB 2-Button Laser Mouse	GW405AA
	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP USB 2-Button Laser Mouse	GW405AA
Memory	HP 512-MB PC2-6400 (DDR2 800-MHz) DIMM	AH056AA
	HP 1-GB PC2-6400 (DDR2 800-MHz) DIMM	AH058AA
	HP 2-GB PC2-6400 (DDR2 800-MHz) DIMM	AH060AA
Audio	HP Thin USB Powered Speakers	KK912AA

After-Market Options

Graphics	ATI Radeon HD 2400 XT 256MB DH PCIe x16 Graphics Card	KD060AA
	ATI Radeon HD 3450 256MB SH PCIe x16 Card - China Only	FG731AA
	ATI Radeon HD 3470 256MB SH PCIe x16 Graphics Card	FH972AA
	ATI Radeon HD 3650 512MB DH PCIe x16 Graphics Card (MT Only)	KS505AA
	ATI Radeon HD 4650 DP (1GB) PCIe x16 Graphics Card	VN566AA
	ATI Radeon HD 4350 HDMI (512MB) FH PCIe x16 Graphics Card	AR956AA
	HP ADD2 SDVO DVI-D Adapter	DY674A
	HP DMS59 DVI Dual-head Connector Cable	DL139A
	HP DisplayPort Cable Kit	VN567AA
	HP DisplayPort To VGA Adapter	AS615AA
	ATI Radeon HD 4550 Dual Head PCIe x16 Graphics Card (MT Only)	AT042AA
	* 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.	
Optical Drives	HP SATA DVD-ROM Drive	AH047AA
	HP SATA SuperMulti LightScribe DVD Writer Drive	GF343AA
	HP 16X SATA Blu-ray Writer BLK	AR482AA
Security	HP Business PC Security Lock Kit	PV606AA
	Security Cable with Kensington Lock	PC766A
Miscellaneous Accessories	Belkin Serial to USB adapter	EM449AA
	Adaptec FireConnect 2100 FireWire (1394) PCI card	PA997A
	HP 2nd Serial Port Adapter	PA716A
	HP Serial/Parallel PCI Card	KD062AA

Memory

DDR SYNCH DRAM NON-ECC MEMORY

The Intel G45S Express chipset supports non-ECC DDR2 memory up to PC2-6400 (800-MHz). Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations.

CAUTION: You must shut down the computer **and disconnect the power cord** before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

HP recommends dual-channel symmetric configurations for maximum performance.

For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

STANDARD MEMORY

512-MB, 1-GB, 2-GB, 4-GB DDR2 SYNCH DRAM

OPTIONAL MEMORY UPGRADES

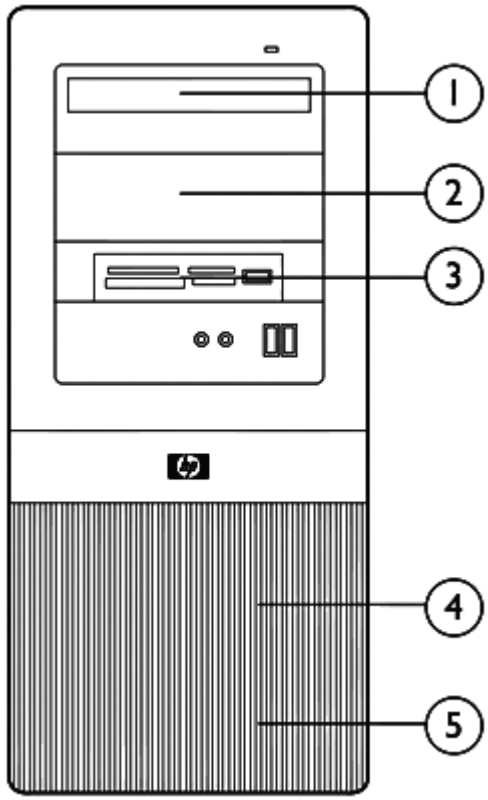
Supports up to 16-GB of DDR2 SYNCH DRAM. Not all memory configurations possible are represented below.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

DIMM Size	Slot 1 (White)	Slot 2 (Black)	Slot 3 (White)	Slot 4 (Black)
512-MB	512-MB			
1-GB	1-GB			
2-GB (dual-channel symmetric)	1-GB		1-GB	
4-GB (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB
4-GB (dual-channel symmetric)	2-GB		2-GB	
8-GB (dual-channel symmetric)*	2-GB	2-GB	2-GB	2-GB
16-GB (dual-channel symmetric)*	4-GB	4-GB	4-GB	4-GB

* For Microtower system only

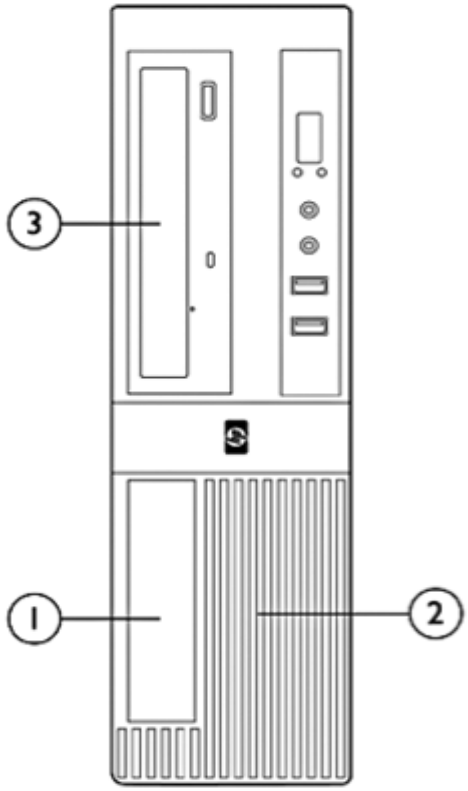
Storage



HP Compaq dx2810 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	3	SIO
Media Reader	1	3	Internal USB 2.0 port
DVD-ROM Drives	2	1, 2	SATA
SuperMulti LightScribe DVD Writer Drives	2	1, 2	SATA
Blu-Ray JB Writer	2	1, 2	SATA
3.5” (8.89 cm) Serial ATA Hard Drives	2	4, 5	SATA
SATA Solid State Drive (SSD)	1	4	SATA

Storage



HP Compaq dx2810 Small Form Factor Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	1	SIO
Media Reader	1	1	Internal USB 2.0 port
DVD-ROM Drives	1	3	SATA
SuperMulti LightScribe DVD Writer Drives	1	3	SATA
Blu-Ray JB Writer	1	3	SATA
3.5” (8.89 cm) Serial ATA Hard Drives	1	2	SATA
SATA Solid State Drive (SSD)	1	2	SATA

Technical Specifications

Integrated Realtek ALC662-GR Audio	**Type**	Integrated
	HD Audio compatible codec	Yes
	Sampling (DAC and ADC)	Supports 44.1/48/96 KHz
	Audio Jacks	Mic-In
		Line-In
		Line-Out / Headphone Out
	Power Support	Digital: 3.3V
		Analog: 5V
	Other	Meets Mircrosoft Windows Vista (WLP 3.08) Premium requirements High-performance DACs with 98dB SNR(A-Weighting) ADCs with 90dB SNR(A-Weighting)

Integrated Realtek 8111C-VB-GR GbE Ethernet Controller	**Connector**	RJ45
	Controller	Realtek 8111C-VB-GR Gigabit Ethernet Controller
	Memory	Transmit/Receive on-chip buffer support
	Data rates supported	2.5GHz data rate with X1 link width.
	Compliance	IEEE 802.1P, 802.1Q, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI Express 1.1
	Data transfer mode	DMA
	Power requirement(LOM)	1000mbps (TxRx) max.740mW 100mbps (TxRx) max.396mW 10mbps (TxRx) max.436mW D3 hot with Link (10M) 261 mW D3 hot without Link 182 mW D3 cold with Link (10M) 168 mW Link D3 cold without Link 89 mW Link
	Network transfer rate	10/100/1000 Mbps over CAT.5
		100/1000 Mbps over CAT.3
		10 Mbps over CAT.3
	Dimensions	9mm x 9mm
	Power Management	ACPI rev 2.0, PCI PM rev 1.1, ASPM v1.0a

Technical Specifications

Intel Gigabit CT Desktop NIC	**Connector**	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI-E 1.0a
	Data path width	X1, 250 MB/s, Bi-directional interface
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM support	Yes
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Environmental	**Operating temperature** 32° to 131°F (0° to 55° C) **Operating humidity** 85% at 131° F (55° C)
	Dimensions	4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm)
	Operating system driver support	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*. No driver is required for this device. Native support is provided by the operating system. Red Hat Linux 7.2, Linux 7.3 and Red Hat Enterprise Linux 3 * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
	Management capabilities	WOL , PXE, DMI, WFM 2.0
LSI PCIe x1 56K International SoftModem	**Data Transmission**	Technology speeds: 56,000 Kbps maximum downstream data, controllerless **NOTE:** 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/ 16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103

Technical Specifications

Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
Power Management	PCI Bus Power Management Interface Specification (PCI-PM) Revision 1.2, Appendix A. D0, D3hot, and D3cold. Wake on Ring state when in D3cold. If the power management event (PME) feature is enabled in D3cold, a modem can wake the system via WAKE# (WAKEN) or beacon. Meets PCI Express 1.1 standard.
Upgradeability	Driver upgradeable for future enhancements
Video	ITU-T V.80 video ready interface
Other	TIA/EIA 602 standard AT command set
	Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface
	Optional ring wakeup signal
Operating Temperature	32° to 158° F (0° to 70° C)
Operating Humidity	20% to 90%, non-condensing
Power	Requires a 3.3-V auxiliary power rail on PCI express bus
	Uses only one PCI express load (i.e., one grant/request pair), one shared IRQ, one electrical load
Chipset	LSI SV92EX – Integrated PCI interface with 3.3-V tolerant buffers and CardBus support
Dimensions (L X H)	Complies with PCI express low profile specifications-—6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
Connection	Single RJ-11 connector
Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
Other	The SV92EX device is packaged in a 32-pin micro leadless chip carrier (MLCC). The SV92EX is fully compliant with the PCI Express revision 1.1 specification. WHQL approved; ASPM compliant.

HP Wireless 802.11 b/g/n PCIe Card	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13112_div/13112_div.html (Worldwide)

Technical Specifications

HP ADD2 SDVO DVI-D Adapter	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12008_div/12008_div.html (Worldwide)
DMS-59 to Dual DVI Cable	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12845_div/12845_div.html (Worldwide)
HP DisplayPort To VGA Adapter	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13111_div/13111_div.html (Worldwide)

Integrated Intel Graphics Media Accelerator X4500HD

3D/2D Controller	Microsoft DirectX® 10 based with support for Pixel Shader 3.0
VGA Controller	Integrated
DVI	Integrated
Bus Type	PCI Express™ x16
RAMDAC	Integrated, 350 MHz
Graphics Engine Clock	667 MHz
Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. For Vista, use of PAVP heavy mode pre-allocates an additional 96MB. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.

Windows XP Memory Usage:

Total System Memory (GB)	Total Graphics memory (MB)	Pre-Allocated (MB)	DVMT (MB)
0.5	128	32	96
	256	32	224
1	512	32	480
1.5	768	32	736
2 GB & more	1024	32	992

Windows Vista Memory Usage:
Support for DVMT 5.0. The graphics driver will determine DVMT memory. DVMT memory = Total GFX memory - Pre-allocated size and fixed memory = Pre-allocated memory.

Technical Specifications

HW Video Decode	Full Hardware Accelerated decode for MPEG2 encrypted video; support for PAVP Lite (default) and Heavy (or Paranoid) modes. Full H.264 and VC1 Variable Length Decode Acceleration and Intel Clear Video Technology Support.
Maximum Color Depth	32 bits/pixel
Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below.
Display Support	Integrated VGA port.
Graphics/Video API Support	Microsoft DirectX® 10, OpenGL® 1.5 (OpenGL® 2.0 available in a driver update)

Resolutions Supported

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

	Maximum Refresh Rate (Hz)
Resolution	**Analog Connection**
640x480	**85**
800x600	**85**
1024x768	**85**
1280x720	**85**
1280x1024	**85**
1440x900	**75**
1600x1200	**85**
1680x1050	**75**
1920x1080	**85**
1920x1200	**85**
1920x1440	**85**
2048x1536	**75**
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections	

ATI Radeon HD 2400XT (256MB DH) PCIe Graphics Card	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12846_div/12846_div.html (Worldwide)	
ATI Radeon HD 3650 (512MB DH) PCIe x16 Graphics Card	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13006_div/13006_div.html (Worldwide)	
ATI Radeon HD 3470 (256 SH) PCIe Graphics Card	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13120_div/13120_div.html (Worldwide)	
ATI Radeon HD 3450	**Bus type**	PCI Express (x16 lanes)

Technical Specifications

(256MB SH) PCIe Graphics Card	**Maximum vertical refresh rate**	85 Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Display max resolution	2560 x 1600 digital, 2048 x 1536 analog	
	Board display options	Supports two displays via the DisplayPort and DVI connectors	
	Board configuration	**Specification**	**Description**
		Graphics Chip	RV620
		Core clock	750 MHz
		Memory clock	500 MHz
		Frame buffer	256 MB DDR2, 128 bit wide
	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish	
	Core power	22 W	
	Dimensions	2.71 in x 6.60 in (68.90 mm x 167.65 mm)	
	Compliance standards	EMC Emissions:	

a. FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b. Taiwanese Standard BSMI
c. Australian C-Tick
d. Korean (MIC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.

ATI Radeon HD 3450 (256MB SH) PCIe Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP.

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	60*

* Only supported when using a dual-link DVI or DP connection
NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

ATI Radeon HD 4550 DH PCIe x16 Graphics Card	**Input/Output connectors**	DMS-59 S-video connector	
	Board display options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output	
	Board configuration	**Specification**	**Description**
		Graphics Chip	RV710
		Core clock	600 MHz
		Memory clock	800 MHz
		Frame buffer	256 MB DDR2, 64 bit wide
	Bus type	PCI Express (x16 lanes)	
	Maximum vertical refresh rate	85 Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Display max resolution	1900 x 1200 digital, 2048 x 1536 analog	

ATI Radeon HD 4550 DH PCIe x16 Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

Resolution	Maximum Refresh Rate (Hz)	
	Analog Connection	Digital Connection
640x480	85	60
800x600	85	60
1024x768	85	60
1280x720	85	60
1280x1024	85	60
1440x900	75	60
1600x1200	85	60
1680x1050	75	60
1920x1080	85	60-R
1920x1200	85	60-R
1920x1440	85	N/A
2048x1536	75	N/A
2560x1600	N/A	N/A

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections.

	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
	Operating systems support	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*. * Certain Windows Vista product features require advanced or additional hardware.

Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Linux x86 and x86_64 distributions using XFree86 or X.Org**.

** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.

Core power 21 W

Option kit contents

- ATI Radeon HD 4550 DH PCIe x16 Graphics Card with full height bracket attached
- DMS 59 to dual VGA Y cable
- Software CD with graphics drivers
- Low profile bracket to convert the card for using in a low profile chassis
- Warranty documentation

Compliance standards

EMC Emissions:
a) FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c) Canadian Standard ICES-003 is equivalent to CISPR22
d) Taiwanese Standard BSMI
e) Japanese VCCI
f) Australian C-Tick
g) Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.

NVIDIA GeForce 205 512MB PCIe x16 Card

Form Factor	ATX Full Height	
Display max resolution	Analog VGA: 2048x1536x32bpp@85Hz DVI: 1920 x 1200 x32bpp @60Hz	
Input/Output connectors	DVI-I+VGA	
Board configuration	**Specification**	**Description**
	Graphics Chip	NVIDIA D10M1-20 (GT218-200-A3)
	Core clock	589 MHz
	Memory clock	790 MHz
	Frame buffer	512 MB DDR3, 64-bit
Core power	30 W (Max board power)	

Technical Specifications

NVIDIA GeForce 205 (512MB) PCIe x16 Graphics Controller display resolutions and refresh rates **NOTE:** Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP.	
Analog Resolution	**Maximum Refresh Rate**
640 x 480	**85 Hz**
800 x 600	**85 Hz**
1024 x 768	**85 Hz**
1280 x 1024	**85 Hz**
1600 x 1200	**85 Hz**
1920 x 1080	**85 Hz**
1920 x 1200	**85 Hz**
1920 x 1440	**85 Hz**
2048 x 1536	**85 Hz**
Digital Resolution	**Maximum Refresh Rate**
640 x 480	**60 Hz**
800 x 600	**60 Hz**
1024 x 768	**60 Hz**
1280 x 1024	**60 Hz**
1600 x 1200	**60 Hz**
1920 x 1200*	**60 Hz**
1920 x 1440**	**60 Hz**
2560 x 1600**	**60 Hz**
* Reduced blanking timings used when connected to a single-link DVI monitor ** Requires a dual-link DVI capable monitor	

NVIDIA GeForce 315 1GB PCIe x16 Card	**Form Factor**	ATX Full Height	
	Display max resolution	Analog VGA: 2048x1536x32bpp@85Hz DVI: 2560 x 1600 x32bpp @60Hz	
	Input/Output connectors	DVI-I +VGA	
	Board configuration	**Specification**	**Description**
		Graphics Chip	D10M2-20 (GT216-200-A2)
		Core clock	625 MHz
		Memory clock	790 MHz
		Frame buffer	1GB DDR3, 128-bit
	Core power	52 W (Max board power)	

Technical Specifications

NVIDIA GeForce 315 (1GB) PCIe x16 Graphics Controller display resolutions and refresh rates **NOTE:** Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP.	
Analog Resolution	**Maximum Refresh Rate**
640 x 480	**85 Hz**
800 x 600	**85 Hz**
1024 x 768	**85 Hz**
1280 x 1024	**85 Hz**
1600 x 1200	**85 Hz**
1920 x 1080	**85 Hz**
1920 x 1200	**85 Hz**
1920 x 1440	**85 Hz**
2048 x 1536	**85 Hz**
Digital Resolution	**Maximum Refresh Rate**
640 x 480	**60 Hz**
800 x 600	**60 Hz**
1024 x 768	**60 Hz**
1280 x 1024	**60 Hz**
1600 x 1200	**60 Hz**
1920 x 1200*	**60 Hz**
1920 x 1440**	**60 Hz**
2560 x 1600**	**60 Hz**
* Reduced blanking timings used when connected to a single-link DVI monitor ** Requires a dual-link DVI capable monitor	

ATI Radeon HD 4350 HDMI (512MB) SH PCIe x16 Graphics Card	**Input/Output connectors**	Dual-link DVI-I/VGA/HDMI	
	Display max resolution	Analog VGA: 1920x1200x32bpp @ 60Hz DVI: 1920x1200x32bpp @ 60Hz HDMI: 1920x1200x32bpp @ 60Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Bus type	PCI Express (x16 lanes	
	Board configuration	**Specification**	**Description**
		Graphics Chip	RV710D2
		Core clock	600 MHz
		Memory clock	500 MHz
		Frame buffer	512 MB DDR2, 64 bit wide
	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish	
	Core power	23 W	
	Compliance standards	EMC Emissions: a. FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use	

b. CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c. Canadian Standard ICES-003 is equivalent to CISPR22
d. Japanese VCCI
e. Taiwanese Standard BSMI
f. Australian C-Tick
g. Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 – Information Technology Equipment - Immunity Characteristics – Limits and Methods of Measurement.

ATI HD4350 (512 MB) PCIe x16 Graphics Controller display resolutions and refresh rates

NOTE:

- Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)

All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

Resolution	Depth(bpp)	CRT Maximum Refresh Rate (Hz) – VGA AND DVI-A (ANALOG)	CRT Maximum Refresh Rate (Hz) – DVI-I (DIGITAL)	CRT Maximum Refresh Rate (Hz) – HDMI
800 x 600	16, 32	60, 75	60, 75	60, 75
1024 x 768	16, 32	60, 75	60, 75	60, 75
1152 x 648	16, 32	NA	N/A	59, 60
1152 x 864	16, 32	NA	60, 75	59, 60
1280 x 720	16, 32	NA	60	50, 59, 60
1280 x 768	16, 32	75	60, 75	60, 75
1280 x 960	16, 32	60	60	60
1280 x 1024	16, 32	60, 75	60, 75	60, 75
1440 x 900	16, 32	60	60	60
1600 x 1200	16, 32	60	60	60
1680 x 1050	16, 32	60	60	60
1920 x 1080	16, 32	NA	59, 60	50, 59, 60
1920 x 1200	16, 32	59, 60	59, 60	59, 60

HP USB PS2 Washable Keyboard

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/13395_div/13395_div.html (Worldwide)

Technical Specifications

HP USB Smart Card Keyboard		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12346_na/12346_na.html (Worldwide)
HP PS/2 or USB Standard Keyboard		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11880_div/11880_div.html (Worldwide)
HP USB 2-Button Laser Mouse		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12912_div/12912_div.html (Worldwide)
HP PS/2 2-Button Optical Scroll Mouse		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12490_div/12490_div.html (Worldwide)
HP USB Optical Scroll Mouse		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11356_div/11356_div.html (Worldwide)
Serial ATA 3.0-Gb/s Hard Drives (7200 rpm)	**80 GB** **160 GB** **250 GB** **320 GB** **500 GB**	**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11356_div/11356_div.html (Worldwide)
SATA DVD-ROM Drive		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12548_div/12548_div.html (Worldwide)
HP SATA SuperMulti LightScribe Drive		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12739_div/12739_div.html (Worldwide)
HP 2nd Serial Port Adapter **HP Parallel Port Adapter** **HP Serial/Parallel PCI Card**		**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12396_div/12396_div.html (Worldwide)

Technical Specifications

HP 1.44-MB Diskette Drive	**Size**	3.5 in (8.89 cm)	
	LED Indicators (front panel)	Green	
	Read/Write Capacity per Diskette (high/low)	1.44 MB/720 KB	
	Drive Height	One-third	
	Drive Rotation	300 rpm	
	Transfer Rate (high/low)	500/250 KB/s	
	Bytes/Sector	512	
	Sectors/Track (high/low)	18/9	
	Tracks/Side (high/low)	80/80	
	Access Times	**Track-to-Track** (high/low)	3/6 ms
		Average (high/low)	94/173 ms
		Settling Time	15 ms
		Latency Average	100 ms
	Cylinders (high/low)	80/80	
	Read/Write Heads	Two	

HP 22-in-1 Media Card Reader	**USB Interface**	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board
	Advance protocol support	• Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50 MHz SD 4-bit card (version 1.1) • Support high-speed 52 MHz MultiMediaCard 8-bit card (version 4.x)
	Supported media types	• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II),MicroDrive (MD) • Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), Picture Card • Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard, Secure MultiMediaCard (Secure MultiMediaCard), ROM Type MultiMediaCard (MultiMediaCard ROM), Reduced Size MultiMediaCard (RS MultiMediaCard), MultiMediaCard 4.0 (MultiMediaCard Plus), Reduced Size MultiMediaCard 4.0 (MultiMediaCard Mobile) • Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo)
	Mechanical	**Length** (3.5”) 124.7 cm **Width** (3.5”) 101.6 cm **Height** (3.5”) 25.4 cm

		Length (5.25")	171.6 cm
		Width (5.25")	148.9 cm
		Height (5.25")	42.7 cm
	Environmental	**Operational Environmental Extremes**	Test Parameters/Conditions - Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. ? 24 hours 10°C 90% R.H. ? 24 hours 20°C 90% R.H. ? 24 hours 30°C 90% R.H. ? 24 hours 40°C 90% R.H. ? 24 hours 50°C 90% R.H. ? 24 hours 50°C 10% R.H. ? 24 hours
		Storage Environmental Extremes	Test Parameters/Conditions 140°F (60°C) @ 80% R.H. for 96 hours -22°F (-30°C) @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	Approvals		USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

Eco Data

Eco-Label Certifications

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration

Small Form Factor

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for this model is based on a typically configured product.

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	82.764 W	81.851 W	82.880 W
Sleep (Energy Star low power mode)	2.4049 W	2.4322 W	2.3640 W
Off	1.2309 W	1.2604 W	1.1852 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	283 BTU/hr	280 BTU/hr	283 BTU/hr
Sleep	8 BTU/hr	8 BTU/hr	8 BTU/hr
Off	4 BTU/hr	4 BTU/hr	4 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	4.3	33
Fixed Disk (random writes)	4.4	34

NOTE: System fan is usually off except when charging the battery

Batteries

This product complies with ISO standards:

- EU Directive 91/ 157/ EEC
- EU Directive 93/ 86/ EEC
- EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 4000 ppm by weight.

The battery type and chemistry used in the product is:
CR2032 (coin cell), Lithium

Additional information:

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

Keyboard complies with ISO standard: ISO 9995, EN 29241-4, and ISO/IEC 15412

Input devices of this product comply with ISO 9241, part 9.

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post consumer recycled plastic (by wt.)

This product is greater than 92.7% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
  - Polyethylene low density 17.02 g
  - Wood 13360 g
- Internal:
  - EPE-Expanded Polyethylene 10.94 g

- The EPE foam packaging material is made from 0% recycled content.
- The corrugated paper packaging materials contains at least 0% recycled content.

Microtower

System Configuration The configuration used for the Energy Consumption and Declared Noise Emissions data for this model is based on a typically configured product.

Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	77.2 W	76.3 W	74.2 W
Sleep (Energy Star low power mode)	2.83 W	2.91 W	2.74 W
Off	1.41 W	1.50 W	1.31 W

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	264 BTU/hr	261 BTU/hr	254 BTU/hr r
Sleep	10 BTU/hr	10 BTU/hr	9 BTU/hr
Off	5 BTU/hr	5 BTU/hr	4 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	4.1	NA
Fixed Disk (random writes)	4.1	NA

NOTE: System fan is usually off except when charging the battery

Batteries This product complies with ISO standards:

- EU Directive 91/ 157/ EEC
- EU Directive 93/ 86/ EEC
- EU Directive 98/ 101/ EEC

Batteries used in the product do not contain:

- Mercury greater the 5ppm by weight

- Cadmium greater than 10ppm by weight
- Lead greater than 4000 ppm by weight.

The battery type and chemistry used in the product is:
CR2032 (coin cell), Lithium

Additional information:

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.

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Keyboard complies with ISO standard: ISO 9995, EN 29241-4, and ISO/IEC 15412

Input devices of this product comply with ISO 9241, part 9.

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post consumer recycled plastic (by wt.)

This product is greater than 92.7% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
  - Polyethylene 25 g
- Internal:
  - Polyester 5 g

- The EPE foam packaging material is made from 0% recycled content.
- The corrugated paper packaging materials contains at least 0% recycled content.

Small Form Factor and Microtower

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.

- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment (http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Hewlett-Packard Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report
http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html

Environment website
http://www.hp.com/environment
Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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